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A Periodical Record of Investigations Bearing on Problems of Food Production, Distribution, Conservation and Consumption, as well as on Public Health, and Race and Population Problems as Related to the Countries Bordering on the Pacific.

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By Helene Tsuruyo Morita

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More frequent publication as acceptable material is contributed.

Agricultural Experiment Stations and Botanical Gardens in Ceylon

The Pan-Pacific Research Institution and the Journal will be glad to receive any information as to Agricultural Experiment Stations in the Pacific not listed in the check list published in this issue. Any corrections of or additions to the list printed will be appreciated.

From the Department of Agriculture. Peradeniya, Ceylon, the Director of Agriculture, F. A. Stockdale, writes:

Sir,

With reference to your letter of April 17, 1928, addressed to the Librarian of this Department, I now have pleasure in forwarding to you a list of the Experiment Stations and Botanic Gardens under the administration of this Department of Agriculture.

Major Experiment Stations:

Central Experiment Station, Peradeniya
Anuradhapura Experiment Station
Jaffna Experiment Station
Galle Agricultural Station
Wariapola Agricultural Station
Ambalentota Cotton Experiment Station.

Minor Experiment Stations:

Borala Experiment Station
Batapola Experiment Station
Bata-ata Rotation Station
Middeniya Rotation Station
Dabarella Cotton Station
Bandaragama Rubber Station
Nalanda Experiment Station
Dambulla Rotation Station
Balangoda Experiment Garden
Godakawela Experiment Garden
Kuruwita Experiment Station
Embilipitiya Cotton Station
Kegalle Experiment Station
Maho Rotation Station
Damana Citronella Station
Vavuniya Rotation Station
Allai Sugar Station
Bibile Experiment Station

Nursery Blocks:

Kumbalgamuwa Nursery Block
Mahaoya Nursery Block
Lahugala Nursery Block
Uhana Nursery Block
Damana Nursery Block

Paddy Seed Stations:

Peradeniya Paddy Experiment Station
Kotmale Paddy Seed Station
Katugastota Paddy Seed Station
Nalanda Paddy Seed Station
Godakawela Paddy Seed Station
Batapola Paddy Seed Station
Borala Paddy Seed Station.
Ratnapura Paddy Seed Station
Kegalle Paddy Seed Station
Akminana Paddy Seed Station.
Tissamaharama Paddy Seed Station
Matugama Paddy Seed Station
Bandaragama Paddy Seed Station
Belunmahara Paddy Seed Station
Kurunegala Paddy Seed Station
Madampe Paddy Seed Station
Anuradhapura Paddy Exp. Station
Uyilankulam Paddy Seed Station
Kanniyal Paddy Seed Station
Paranthan Paddy Farm
Vavuniya Paddy Seed Station
Illuppaddaichenai Paddy Seed Station
Sengapadai Paddy Seed Station
Badulla Paddy Seed Station.

Botanic Gardens Controlled by the Department of Agriculture

Royal Botanic Gardens, Peradeniya.
Hakgala Bontanic Gardens.
Heneratgoda Botanic Gardens.

A Check List of Agricultural Experiment Stations in the Pan-Pacific and Indian Ocean Areas, including Africa

Stations in Canada and mainland U. S. omitted.

PANAMA

Agricultural Experimental Institutions

Sr. José Marie Fernandez, Ministerio de Fomento, Panama.
Bureau of Agriculture, Panama, Republic of Panama.

MEXICO

Estacion Agricola Experimental, Tuxtla Gutierrez, Chiapas.
Estacion Agricola Experimental, Guerrero, Chihuahua.
Estacion Agricola Experimental, Durango, Durango.
Estacion Agricola Experimental, San Rafael, Guadalajara, Jalisco.
Estacion Agricola Experimental, Toluca, Mexico.
Estacion Agricola Experimental, Monterey, Nuevo Leon.
Jardin Botanico, Oaxaca, Oaxaca.
Camara Agricola Nacional Jalisciense, San Rafael, Guadalajara, Jalisco.
Estacion Agricola Experimental, Zapopan, Guadalajara, Jalisco.
Estacion Agricola Experimental, Rio Verde, San Luis Potozi.
Estacion Agricola Experimental, Villa Hermosa, Tabasco.
Estacion Agricole Experimental, Tlacotepec-Tecamachaleo, Puebla.
Estacion Agricola Experimental, Jalapa, Vera Cruz.
Estacion Agricola Experimental, Rio Grande, Zacatecas.

COLOMBIA

Agricultural Experimental Institutions

Estacion Agronomica Tropical, Bogota.
Ministerio de Obras Publicas y Formento, Apartado 122, Bogota.
Escuela Experimental de Agricultura y Agronomia, San Lorenzo, Tolima.
Escuela Inferior de Agronomia, Apartado 635, Bogota.

ECUADOR

Agricultural Experimental Institutions

Estacion Experimental, Quinta Normal, Ambato.
Laboratorio Municipal de Guayaquil, Guayaquil.

PERU

Agricultural Experimental Institutions

Experiment Station, Chuquibambilla, (Sheep)
Estacion Experimental de Viticultura y Enclogia, Ica.
Escuela Nacional de Agricultura y Veterinaria y Granya-Eucuela, Lima.
Estacion Central Agronomica del Peru, Lima, (?)
Estacion Experimental de Algodon, Lima.
Estacion Experimental de Zootecnia, Lima.
Jardin Botanico, Parque de la Exposicion, Lima.
Laboratorio de Plagas Algodoneras, Piura. (Cotton diseases)
Agricultural Experiment Station, Moquegua, Peru, South America.

BOLIVIA

Agricultural Experimental Institutions

Experiment Station, Ucha-Ucha.

CHILE

Agricultural Experimental Institutions

Agricultural Experiment Station, Quinta Normal, Santiago.
Botanical Garden, Quinta Normal, Santiago.
Estacion Enologica, Santiago.
Estacion Experimental, Casilla 537, Santiago.
Instituto Biológico de la Sociodad Nacional de Agricultura, San Francisco 2291, Santiago.
Ministerio de Industrias y Obras Publicaz, Santiago.
Meteorological Station, Temuco.

HAWAII

Agricultural Experimental Institutions

Hawaiian Sugar Planters' Association Experiment Station, Honolulu.
Experiment Station, Association of Hawaiian Pineapple Canners, Honolulu, T. H.
U. S. Experiment Station, Honolulu, Hawaii.

GUAM

U. S. Agricultural Experiment Station, Island of Guam.

AUSTRALIA

Agricultural Experimental Institutions

New South Wales

Narara Viticultural Station, Hogan's Brush, near Gosford.
Viticultural Station, Howlong.
Hawkesbury Agricultural College and Experimental Farm, Richmond.
Botanic Garden and Government Domains, Sydney.
Bureau of Microbiology (Station of Vegetable Pathology), Sydney.
Technological Museum, Sydney.
State Farms:
Experimental Farms, Bathurst.
Demonstration Farm, Coonamble.
Experimental Farm, Cowra.
Experimental Farm, Glen Innes.
Experimental Farm, Grafton.
Demonstration Farm, Temora.
Experimental Farm, Trangie.
Wagga Experimental Farm, Wagga-Wagga.
Experimental Farm, Wollongbar.
Yanco Irrigation Farm, Yanco.

Queensland

Acclimatization Society, Brisbane (with experimental grounds at Lawton and Rockingham).
Botanic Department, Brisbane.
Bureau of Sugar Experiment Stations, Brisbane.
Sugar Experiment Station, Bundaberg.
Kamerunga State Nursery, Cairns.
Agricultural College and Experiment Farm, Gatton.
Central Sugar Experiment Station, Mackay.
Botanic Garden, Port Darwin.
Sugar Experimental Station, South Johnstone.
Stock Experiment Station, Townsville.
Stock Experiment Station, Yeerongpilly.
State Farms:
Roma State Experimental Farm, Bungeworgorai
Gindie Farm, Central District.
State Farm, Kairi.
Warren Experimental Farm, Stanwell.
Hermitage Farm, Warwick.

South Australia

Botanic Garden, Adelaide.
Hackney Road Orchard, Adelaide.
Waite Agricultural Research Institute, University of Adelaide, Glen Osmond (3½ miles from Adelaide).
Experiment Orchard, Berri, River Murray.
Government Experimental Orchard, Blackwood.
Booborowie Experimental Farm, Booborowie, via Buria.
Experimental Farm, Kybybolite.
Government Experimental Farm, Minnipa, Central Eyre Peninsula.
Fullarton Experimental Orchard, Mitcham.
Central Poultry Station, Parafield.
Agricultural College and Experimental Farm, Roseworthy.
Government Experimental Farm, Turretfield.
Experimental Farm, Veitch's Well.

Tasmania

Botanic Garden, Hobart.
State Farm, Hobart.

Victoria

Botanic Gardens, Melbourne.
National Herbarium, Melbourne.
Experimental Farm, Rutherglen.
Central Research Farm, Weribee.

Western Australia

Experimental Farm, Chapman.
Experimental Farm, Merredin.

TERRITORY OF NEW GUINEA

Agricultural Experimental Institutions

Botanic Gardens, Rabaul.
Experimental Station, Department of Agriculture, Rabaul.

NEW ZEALAND

Agricultural Experimental Institutions

Horticultural Station, Arataki, near Hastings.

Northern Territory

Botanic Garden, Port Darwin.
Ashburton Experimental Farm, Ashburton, Canterbury.
Colonial Botanic Garden, Auckland, Auckland.
Colonial Botanic Garden, Christchurch, Canterbury.
Department of Agriculture, Christchurch, Canterbury.
Papanui Experimental Orchard, Christchurch, Canterbury.
Colonial Botanic Garden, Dunedin, Otago.
Colonial Botanic Garden, Invercargill, Otago.
Canterbury Agricultural College, Lincoln, Canterbury.
Colonial Botanic Garden, Napier, Hawkes Bay.
Cawthron Research Institute, Nelson.
Waikato Experiment Station, Ruakura, Auckland.
Horticultural Station, Tauranga, Auckland.
Horticultural Station, Te Kanwhata.
Moumahaki Experimental Farm, near Waverly, Wellington (Sheep).
Colonial Botanic Garden, Wellington, Wellington.
New Zealand Department of Agriculture, Wellington.
Seed Testing Station, Wellington.
Central Development Farm, Weraroa.

FIJI

Agricultural Experimental Institutions

Botanic Gardens, Suva.
Department of Agriculture, Suva.

JAPAN

Agricultural Experimental Institutions

Aichi Kenritsu Noji Shikenjo, Kohosu-cho, Nishi-Kasugai-gun, Aichi-ken.
Akita Kenritsu Noji Shikenjo, Ushijima-cho, Kawabe-gun, Akita-ken.
Aomori Kenritsu Noji Shikenjo, Kuroishi-cho, Minami-Tsugaru-gun, Aomori-ken.
Chiba Kenritsu Noji Shikenjo, Nakayama-mura, Higashi-kadsuragi-gun, Chiba-ken.
Ehime Kenritsu Noji Shikenjo, Dogo-mura, Onzen-gun, Ehime-ken.
Nokwai Noji Shikenjo, Fukui-shi, Fukui-ken.
Fukuoka Kenritsu Noji Shikenjo, Sumiyoshi-cho, Tsuku-shi-gun, Fukuoka-ken.
Fukushima Kenritsu Noji Shikenjo, Koriyama-cho, Asaka-gun, Fukushima-ken.
Gifu Kenritsu Noji Shikenjo, Kano-mura, Inaba-gun, Gifu-ken.
Gunma Kenritsu Noji Shikenjo, Maebashi-shi, Maeshiroda, Gunma-ken.
Hiroshima Kenritsu Noji Shikenjo, Saijo-cho, Kamo-gun, Hiroshima-ken.
College of Agriculture, Sapporo, Hokkaido.
Hokkaido Imperial University, College of Experimental Forests, Sapporo, Hokkaido.
Hokkaido Noji Shikenjo, Kotoni, Sapporo-fu, Hokkaido.
Hyogo Kenritsu Noji Shikenjo, Akashi-cho no uchi Oji-mura, Akashi-gun, Hyogo-ken.
Ibaraki Kenritsu Noji Shikenjo, Sakado-mura, Higashi-ibaraki-gun, Ibaraki-ken.
Ishikawa Kenritsu Noji Shikenjo, Sanma-mura, Ishikawa-gun, Ishikawa-ken.

College of Agriculture, Morioka, Iwate-ken.
Iwate Kenritsu Noji Shikenjo, Motomiya, Morioka-shigwai, Iwate-ken.
Kagawa Kenritsu Noji Shikenjo, Kuribayashi-mura, Kagawa-gun, Kagawa-ken.
College of Agriculture, Kagoshima.
Kagoshima Kenritsu Noji Shikenjo, Kamiarata-cho, Kagoshima-shi, Kagoshima-ken.
Kanagawa Kenritsu Noji Shikenjo, Ofune, Kamakura-gun, Kanagawa-ken.
Karafuto-cho Nojo Shikenjo, Namikawa, Karafuto (Sachaline).
Kochi Kenritsu Noji Shikenjo, Nagaoka-mura, Nagaoka-gun, Kochi-ken.
Kumamoto Kenritsu Noji Shikenjo, Idsumi-mura, Hotaku-gun, Kumamoto-ken.
Kyoto Furitsu Noji Shikenjo, Katsura-mura, Kadono-gun, Kyoto-fu.
Mie Kenritsu Noji Shikenjo, Tsu-shi, Mie-ken.
Miyagi Kenritsu Noji Shikenjo, Naga-cho, Natori-gun, Miyagi-ken.
Miyazaki Kenritsu Noji Shikenjo, Akae, mura, Miyazaki-gun, Miyazaki-ken.
Nagano Kenritsu Noji Shikenjo, Seridamura, Kami-minochi-gun, Nagano-ken.
Nagasaki Kenritsu Noji Shikenjo, Nakagawa-go, Nagasaki-shi, Nagasaki-ken.
Nara Kenritsu Noji Shikenjo, Aburazaka-cho, Nara-shi, Nara-ken.
Niigata Kenritsu Noji Shikenjo, Kesajiro, Nagaoka-shi, Niigata-ken.
Okayama Kenritsu Noji Shikenjo, Takamatsu-mura, Kibi-gun, Okayama-ken.
Ohara Institute of Agricultural Investigation, Kurashiki, Okayama-ken.
Okinawa-ken Togyo Shikenjo, Nishihara Omura, Gaja, Nakagan-gun, Okinawa-ken.
Osaka Furitsu Noji Shikenjo, Haranochaya, Henomatsu, Sakai, Osaka-fu.
Osaka Furitsu Noji Shikenjo, Izukitagori, Henomatsu-mura, Osaka-fu.
Imperial Agricultural Experiment Station, Kashiwara, near Osaka.
Kinai Branch Imperial Agricultural Experiment Station, Osaka-fu.
Saga Kenritsu Noji Shikenjo, Kono-mura, Saga-gun, Saga-shi, Saga-ken.
Saitama Kenritsu Noji Shikenjo, Tamai-mura, Osato-gun, Saitama-ken.
Shidzuoka Kenritsu Noji Shikenjo, Kano-mura, Abe-gun, Shidzuoka-ken.
Imperial Horticultural Experiment Station, Toyoda-mura, Okitsu, Shidzuoka-ken.
Shiga Kenritsu Noji Shikenjo, Beppo, Zezecho, Shiga-gun, Shiga-ken.
Shimane Kenritsu Noji Shikenjo, En'Ya-mura, Hikawa-gun, Shimane-ken.
Sotokufu Togyo Shikenjo, Kaimokko, Taiwan.
Government Forestry Experiment Station, Taihoku, Taiwan.
Taiwan Noji Shikenjo, Chonaiho-sho, Taikazei-ho, Toen-cho, Taiwan.
Taiwan Sotokufu Noji Shikenjo, Chonaihocho, Taihoku-shi, Taiwan.
Imperial Agricultural Experiment Station, Kashiwara, near Osaka.
Ryuko Mensaku Shikenjo, Ryuko-gun, Heinnando, Chosen.
Tochigi Kenritsu Shikenjo, Udsu-no-miyashi, Imaidzumi-cho, Tochigi-ken.
Tokushima Kenritsu Noji Shikenjo, Kamomyo-mura, Hagashi-myoto, Myoto-gun, Tokushima-ken.
College of Agriculture, Tokyo.
Imperial University, Botanic Garden, Tokyo.
Jueki Chisasho, Tokyo. (Animal disease investigation.)
Nishigahara Noji Shikenjo, Takinokawamura, Kita-toyoshima-gun, Tokyo-fu.
Station Experimentale de Fermentation, Tokyo.
Tokyo Furitsu Noji Shikenjo, Nakano-cho, Toyotama-gun, Tokyo-fu.
Tokyo Furitsu Sangyo Shikenjo, Nakanocho, Toyotama-gun, Tokyo-fu.
Tottori Kenritus Noji Shikenjo, Miho-mura, Iwami-gun, Tottori-ken.
Toyama Kenritsu Noji Shikenjo, Horikawamura, Kami-niigata-gun, Toyama-ken.
Ugo-Kenritsu Noji Shikenjo, Omagari, Ugoken.
Wakayama Kenritsu Noji Shikenjo, Tsurutachi-jima, Miya-mura, Wakanoura-cho, Kaiso-gun, Wakayama-ken.
Yamagata Kenritsu Noji Shikenjo, Yamagata-shi, Mikka Machi, Yamagata-ken.
Yamaguchi Kenritsu Noji Shikenjo, Ouchimura, Yoshiki-gun, Yamaguchi-ken.
Yamanashi Kenritsu Noji Shikenjo, Ise-cho, Kofu-shi, Yamanashi-ken.
Department of Agriculture of the Government Research Institute, Taihoku, Formosa.
Chara Institute for Agricultural Investigations, Chara, Japan.

INDO CHINA

Agricultural Experimental Institutions

Annam

Atelier de Grainage, Binh-dinh, Annam, Indochine. (Silkworms)
Station d'Arbres Fruitières, Dalat (Langbian), Annam, Indochine. (Fruits)
Station Agricole, Dang-kia (Lang-bian), Annam, Indochine.
Bureau Central, Huè, Annam, Indochine.
Station Sericicole, Huè, Annam, Indochine. (Silkworms)
***Atelier de Grainage, Quang-ngai, Annam, Indochine. (Silkworms)
Station Sericicole, Song-cau, Annam, Indochine. (Silkworms)
Station Sericicole, Thanh-hoa, Annam, Indochine. (Silkworms)
Station Sericicole, Vinh, Annam, Indochine. (Silkworms)

Cambodge

Champs de Demonstration pour la Culture du Riz, Battambang, Cambodge, Indochine. (Rice)
Champs de Demonstration pour la Culture du Riz, Kampot, Cambodge, Indochine. (Rice)

Champs de Demonstration pour la Culture du Riz, Kandal, Cambodge, Indochine. (Rice)
Champs de Demonstration pour la Culture du Riz, Kompong-Chnang, Cambodge, Indochine. (Rice)
Champs de Demonstration pour la Culture du Riz, Kompang-cham, Cambodge, Indochine. (Rice)
Champs d'Essais, Krabao, Cambodge, Indochine. (Cotton, coffee and coconuts)
Station Agricole et Sericicole, Petit-Takeo, Cambodge, Indochine. (Farm crops and silkworms)
Etablissement Sericicole, Pnom-Basset, Cambodge, Indochine. (Silkworms)
Musèe Agricole et Commercial, Pnom-Penh, Cambodge, Indochine.
Bureau Central, Pnom-Penh, Cambodge, Indochine.
Station d'Études Agricoles et Sericicoles du Val d'Emeraude (Chaine de l'Éléphant), Popok-Vil, Cambodge, Indochine. (Crops and silkworms)
Champs de Demonstration pour la Culture du Riz, Pursat, Cambodge, Indochine. (Rice)
Champs de Demonstration pour la Culture du Riz, Takeo, Cambodge, Indochine. (Rice)

Cochinchine

Station Rizicole, Baclieu, Cochinchine, Indochine. *Dir. M. Pham-tan-Man. (Rice)
Magnanerie Modèle, Batri, Cochinchine, Indochine. Dir. Nguyen-van-Diau. (Silkworms)
Magnanerie Modèle, Bencat, Cochinchine, Indochine. Dir. Vuong-van-Khue. (Silkworms)
Station Agricole, Bencat, Cochinchine, Indochine. Dir. Marcel Lelarge. (Rubber)
Station Rizicole, Cailay, Cochinchine, Indochine. Dir. M. Huynh-van-Lieng. (Rice)
Magnanerie Modèle, Cailay, Cochinchine, Indochine. Dir. M. Huynh-van-Lieng. (Silkworms)
Station Rizicole, Cantho, Cochinchine, Indochine. Dir. M. Tran-van-Huu. (Rice)
Magnanerie Modèle, Cap St. Jacques, Cochinchine, Indochine. **Lt. Tabalon. (Silkworms)
Motoculture Station, Cau-an-ha, Cochinchine, Indochine. Dir. Maydell Legras. (Tractor farming)
Magnanerie Modèle, Caukè, Cochinchine, Indochine. **Le-van-Dong. (Silkworms)
Magnanerie et Grainage, Chomoi, Cochinchine, Indochine. **Nguyen-duc-Hoa. (Silkworms)
Station Rizicole, Phu-my, Cochinchine, Indochine. (Rice)
Station Central de Sericicole et de Grainage de Saigon, Saigon, Cochinchine, Indochine. Dir. M. Louis Angles. (Silkworms)
Laboratoire de Génétique et de Selection de Semences, Jardin Botanique, Saigon, Cochinchine, Indochine. Dir. M. Edmond Carle. (Selection and breeding—seeds)
Laboratoire de Chimie, Jardin Botanique, Saigon, Cochinchine, Indochine. Dir. M. Basset. (Chemical research work)
Jardin Botanique de Saigon, Saigon, Cochinchine, Indochine. **Xavier Salamon.
Musèe Économique, Saigon, Cochinchine, Indochine. **Henri Pretre.
Laboratoire d'Analyses et de Recherches Agricoles et Industrielles de Saigon, Saigon, Cochinchine, Indochine.
Institut Scientifique, Saigon, Cochinchine, Indochine.
Service de Riziculture—Laboratoire, Saigon, Cochinchine, Indochine. (Rice)
Station Rizicole, Soctrang, Cochinchine, Indochine. Dir. M. Pham-dang-De. (Rice)
Magnanerie et Grainage, Tan-chau, Cochinchine, Indochine. **Dinh-manh-Triet. (Silkworms)
Magnanerie Modèle, Thudaumot, Cochinchine, Indochine. **Lt. Imbert. (Silkworms)
Station Rizicole, Vinhlong, Cochinchine, Indochine. Dir. Louis Bouillere. (Rice)

Laos

Station Sericicole, Saravane, Laos, Indochine. (Silkworms)
Station Sericicole, Savannakhet, Laos, Indochine. (Silkworms)
Station Sericicole, Tchépone, Laos, Indochine. (Silkworms)
Jardin d'Essais, Vientiane, Laos, Indochine. (Miscellaneous crops)
Station Sericicole, Vientiane, Laos, Indochine. (Silkworms)
Station Agricole, Kieng-Khouang, Laos, Indochine. (Fruit and tea)

Tonkin

Champs d'Essais pour le Tabac, Bac-Kan, Tonkin, Indochine. (Tobacco)
Station Entomologique, Cho-ganh, Tonkin, Indochine. (Coffee insects)
Station de Demonstration Agricole, Haiduong, Tonkin, Indochine. (Rice)
Musèe Agricole et Commercial Maurice Long, Hanoi, Tonkin, Indochine.
Laboratoire d'Analyses Agricoles, Hanoi, Tonkin, Indochine.
Bureau Central, Hanoi, Tonkin, Indochine.
Établissement de Grainage avec Magnanerie Annex, Kien-an, Tonkin, Indochine. (Silkworms)
Station Experimentale Agricole et Forestière. Phu-ho (Près de Phu-tho), Tonkin, Indochine. (Field crops, especially tea and coffee)
Etablissement de Grainage avec Magnanerie Annex, Phu-lang-thuong, Tonkin, Indochine. (Silkworms)
Station de Recherches Sericicoles, Phy-lang-thuong, Indochine.
Magnanerie d'Altitude, Ta-Phing (Laokay), Haut-Tonkin, Indochine. (Silkworms)

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* Director.
** In charge.
*** Atelier de Grainage, Nha-trang, Annam, Indochine. (Silkworms)
*** Station Sericicole, Quang-nam, Annam, Indochine. (Silkworms)

Station Agronomique, Tuyen-quang, Tonkin, Indochine. (Field crops)
Établissement de Grainage avec Magnanerie Annex, Vietri, Tonkin, Indochine. (Silkworms)
Station de Demonstration Agricole, Vinhyen, Tonkin, Indochine. (Rice)

PHILIPPINE ISLANDS

Poultry-swine stations are maintained by the Bureau of Agriculture at
Dingle, Iloilo.
Balayan, Batangas.
Naic, Cavite.
Tisong, Tayabas.
Santa Barbara, Pangasinan.
Palo-Leyte.
Bayamboug, Nueva Vizcaya.
Bilai, Bohol.
Amulong, Cagayan.
Vigan, Ilocos Sur.
Los Banos, Laguna.
San Jose, Antique.
Ibagan, Isabela.
San Antonio, Zambales.
Alabang Central Rice Breeding Station, Alabang, Rizal.
Alabang Stock Farm, Alabang, Rizal.
Batangas Breeding Station, Batangas, Batangas.
Batangas Commercial Citrus Station, Batangas, Batangas.
Bayomboug Cattle Breeding Station, Bayomboug, Nueva Vizcaya.
Bongaton Stock Farm, Bongaton.
Botonc Semi-temperate Fruit Station, Bontoc, Lepanto-Bontoc.
La Carlota Experiment Station, Carlota, Negros Occidental. (Plant industry and animal husbandry work)
Cebu Breeding Station, Cebu, Cebu.
Cebu Corn Breeding Station, Cebu, Cebu.
Cottahato Tobacco Station, Cebu, Cebu.
Dammao Tobacco Station, Gamu, Isabela.
Isabela Corn Breeding Station, Isabela, Isabela.
Lamao Experiment Station, Lamao. (Plant industry)
La Paz Demonstration Station, La Paz.
Lipa Demonstration Farm, Lipa, Batangas.
Experiment Station of the College of Agriculture, University of the Philippines, Los Banos, Laguna.
Singalong Propagation and Testing Station, Manila.
Negros Oriental Breeding Station.
Pangasinan Rice Breeding Station, Pangasinan.
San Pablo Station, San Pablo, Laguna. (Plant propagation)
Santa Cruz Demonstration Station, Santa Cruz, Laguna.

UNFEDERATED MALAY STATES
also
FEDERATED MALAY STATES AND STRAITS SETTLEMENTS
Agricultural Experimental Institutions

Malay Peninsula Agricultural Association, Scientific Department, Caledonia Estate, Province Wellesley. (Rubber and coconuts) (Straits Settlements)
Coconut Experimental Station, Klang, Selangor, Fed. Malay States.
Experimental Plantation, Kuala Kangsar, Perak. (Minor products) (Fed. Malay States)
Department of Agriculture, Kuala Lumpur, Selangor, Fed. Malay States.
Malacca Rice Testing Station, Malacca, Straits Settlements.
Titi Serong Experiment Station, Perak. (Rice) (Fed. Malay States)
Rubber Growers' Association Laboratory, Petaling Estate, Selangor, Fed. Malay States.
Experimental Plantation, Serdang, Selangor, Fed. Malay States.
Botanic Gardens, Singapore, Fed. Malay States.
Castleton Estate, Teluk Anson, Perak. (Rubber) (Fed. Malay States)
Government Experimental Plantation, Batu-Tiga, Selangor, Fed. Malay States.
Government Experimental Plantation, Gunong Angs, Negri Sembilan, Fed. Malay States.
Experimental Plantation, Kuala Lumpur, Selangor, Fed. Malay States.
Government Plantation, Kuala Tembeling, Straits Settlements.
Government Experimental Plantation, Pekan, Trengganu, Unfed. Malay States.
Padi Test Station, Permatang To'Jaya, Prov. Wellesley, Straits Settlements.
Government Plantation, Pondok Tanjong, Straits Settlements.
Government Coconut Plantation, Sapintas, Straits Settlements.

DUTCH EAST INDIES
Agricultural Experimental Institutions

Java

Algemeen Proefstation van den Landbouw, Batavia.
Department van Landbouw, Batavia.
Kina Proefstation, Batavia. (Cinchona)
Proefstation Middenjava te Salatiga, Batavia.
Proefstation van Thee, Batavia.
Proefstation voor Rijst, Batavia.
Agricultuur Chemisch Laboratorium, Buitenzorg.
Algemeen Proefstation voor Thee, Buitenzorg.
The Central Rubber Station, Buitenzorg.
Cultuurtuin, Buitenzorg.
Experiment Station for Forestry, Buitenzorg.
Gouvernements Kina-Ondernening, Buitenzorg. (Cinchona)
Instituut voor Plantenziekten, Buitenzorg.
Laboratorium voor Agrogeologie en Grondonderzoek, Buitenzorg.
Proefstation voor den Landbouw, Buitenzorg.
Proefstation voor Rijst en Tweede Gewassen, Buitenzorg.

Proefstation voor Vorstenlandsche Tabak, Buitenzorg.
The Rubber Experimental Station, "West Java," Buitenzorg.
Seed Culture Department (Afdeeling Zaadteelt), Buitenzorg.
s'Lands Caoutchoucbedrijf, Buitenzorg.
s'Lands Planteatuin, Buitenzorg .
Besoekish Proefstation, Djember.
Proefstation voor Vorstenlandsche Tabak, Klaten, Soerakarta.
Government Rubber Estate, Langsa. (Acheen)
Experimental Station "Malang," Malang.
Proefstation voor Suikerriet in Oost Java, Passoeroean.
Trial Garden of the Proefstation voor Vorstenlandsche Tabak, Samangkak.
Central Java Experiment Station, Samarang.
Proefstation voor de Java-Suiker-industrie, Samarang.
Proefstation Malang, Soerabaja.
Proefstation voor de Java-Suiker-industrie, Soerabaja.
Gouvernements Kina-Proefstation, Tjinjiroean (Bandoeng).
Gutta-Percha Estate, Tjipetir near Tjibadak (Preangar Regencies).
Proefstation voor het Vorschwegan, Weltevreden.

Sumatra

Algemeen Proefstation, Algemeene Vereeniging van Rubberplanters Oostkust Sumatra, Medan.
Algemeen Proefstation der Avros, Medan.
Deli Proefstation, Medan.

JAVA AND SUMATRA

Agricultural Experimental Institutions

Royal Magnetic and Meteorological Observatory, Batavia, Java. Director, C. Brock.
Central Rubber Station, Buitenzorg, Java. Director, Dr. O. de Vries.
Laboratory for Veterinary Research, Buitenzorg, Java. Director, Dr. C. Bubberman.
Forest Research Institute, Buitenzorg, Java. Director, Dr. R. Wind.
Institute for Plant Diseases, Buitenzorg, Java. Director, Dr. C. J. J. van Hall.
General Agricultural Experiment Station, Buitenzorg, Java. Director, Dr. P. J. S. Cramer.
Government Botanical Gardens, Buitenzorg, Java. Director, Dr. W. M. Docters van Leeuwen.
Physiology Fund, Buitenzorg, Java. Physiologist, Dr. W. Bobilioff.
General Experiment Station for Tea and Rubber in West Java, Buitenzorg, Java. Director, Dr. C. J. Bernard.
Experiment Station, Cheribon, Java. Director, Dr. B. J. Konigsberger.
Agricultural Experiment Station, Deli, Java. Director, Dr. B. T. Palm.
Scientific Service of the Rubber Culture Maatschapij (Amsterdam), Galang, near Medan, Sumatra (East Coast).
Plantation Research Department of the United States Rubber Plantation, Inc., Kisaran, Sumatra.
Experiment Station for Tobacco, Klaten, Java. Director, Dr. A. D'Agremond.
General Experiment Station of the A. V. R. O. S. (Experiment Station of the General Association of East Coast Sumatra Rubber Planters), Medan, Sumatra. Director, Dr. A. W. K. de Jong.
Melang Experiment Station, Melang, Java. Director, Dr. A. J. Ultee.
Sugar Experiment Station, Pasoroean, Java. Director, Dr. P. van Harriveld.
Government Cinchina Experiment Station, Cinchona Plantations, Tjinjiroean, Pengalengan, near Bandoeng, Java. Director, Dr. M. Kerbosch.
Experiment Station for Tea (Malabar), Pengalengan, near Bandoeng, Java. Director, Mr. K. A. R. Bosscha.
Experiment Station for Central Java, Salatiga, Java. Acting director, Dr. C. J. Bernard.
Rubber Experiment Station, West Java—Combined with the Central Rubber Station at Buitenzorg Jan. 1, 1926.
Proefstation voor het Boschwezen, Weltevreden (bei Batavia), Java.

PORTUGUESE INDIA

Agricultural Experimental Institutions

Direccao dos Serviços Agricolas e Florestais, Nova Goa.

CEYLON

Agricultural Experimental Institutions

Ambalantota Experiment Station, Ambalantota. (Cotton)
Anuradhapura Experiment Station and Branch Botanic Garden, Anuradhapura.
Badulla Branch Botanic Garden, Badulla.
Bakgala Branch Botanic Garden, Bakgala.
Benaratgoda Branch Botanic Garden, Benaratgoda.
Nawara Eliija Branch Botanic Garden, Nawara Eliija.
Director of Agriculture, Ceylon Department of Agriculture, Perandeniya.
Experiment Station, Perandeniya.
Royal Botanic Garden, Perandeniya.

INDIA

Agricultural Experimental Institutions

Assam

Indian Tea Association, Scientific Department, Cinnamara.
Sugar Cane Station, Jorhat.
Rice Station, Karimganj.
Fruit Experiment Station, Shillong.
Government Rice Station, Titabar.
Tocklai Experiment Station of the Indian Tea Association, Tocklai.
Potato Station, Upper Shillong.

Bengal

Agricultural Station, Bankura.
Agricultural Station, Barisal.
Agricultural Station, Berhampur. (Local crops; sugar cane)

Sericultural Research Station, Berhampur.
Agricultural Station, Bogra.
Agricultural Station, Burdan.
Agricultural Station, Burirhat (Rangpur).
Agri-Horticultural Society of India, Calcutta.
Imperial Bacteriological Laboratory, Muktesar, Calcutta.
Royal Botanic Gardens, Botanical Survey of India, Calcutta.
Agricultural Station, Chinsura.
Agricultural Station, Comilla.
Agricultural Station, Dacca. (Fiber plants, sugar cane, dairy cattle)
Maharajah's Garden, Darbhangah.
Lloyd Botanical Garden, Darjiling.
Agricultural Station, Dhanbari.
Agricultural Station, Gosaba.
Agricultural Station, Jamalpur (Mymensingh).
Agricultural Station, Jessor.
Agricultural Station, Kalimpong. (Field crops, fruit and animal husbandry)
Sericultural Research Station, Kalimpong.
Agricultural Station, Kishoregunj.
Sericultural Research Station, Kurseong.
Government Cinchona Plantations, Mungpoo.
Agricultural Station, Mymensingh.
Agricultural Station, Pabna.
Agricultural Station, Rajshahi.
Agricultural Station, Rangpur. (Cattle farm)
Agricultural Station, Rangpur. (Demonstration Station)
Department of Royal Botanic Gardens, Sibpur.
Agricultural Station, Suri.

Bihar and Orissa

Agricultural Station, Angul.
Agricultural Station, Balasor.
Agricultural Station, Chaibasa.
Agricultural Station, Chianki.
Agricultural Station, Cuttack.
Agricultural Station, Jamui.
Agricultural Station, Khurdha.
Agricultural Station, Neterhat.
Agricultural Station, Purulia.
Agricultural Research Institute, Pusa.
Agricultural Station, Ramgarh.
Agricultural Station, Ranchi (Kanke).
College Home Farm, Sabour. (Jute, sugar cane, rice and other farm crops)
Agricultural Station, Sambalpur.
Cattle-Breeding Farm and Sugar Cane Station, Sipaya .

Bombay Presidency

Agricultural Station, Alibagh.
Sugar Cane Station, Amalsad.
Cattle-Breeding Farm, Bankapur. Amrit Mahal Breed)
Sugar Cane Station, Baramati.
Municipal Gardens, Bombay.
Agricultural Station, Broach. (Substation of the Surat Station.) (Cotton and soil improvement)
Cattle Farm, Chharodi, Upper Gujrat, (Kankraj Breed)
Cotton Station, Dharwar.
Agricultural Station, Dhulia. (Cotton and peanuts)
Agricultural Station, Dohad. (Wheat and irrigation crops).
Agricultural Station, Gadag.
Agricultural and Botanical Station, Ganeshkind, Kirkee. (Horticultural course given)
Ganeshkind Botanical Garden, Poona District. (Horticultural investigations and wheat)
Botanic Garden, Gharpuri, Poona District.
Experiment Station, Hatkhamba. (Branch of the Ratnagiri Station)
Agricultural Station, Jacobabad. (Wheat).
Agricultural Station, Jalgaon. (Cotton)
Municipal Garden, Karachi.
Willingdon Cattle Farm, Malir, Karachi. (Red Sind and Thar Parkar Breeds)
Rice Breeding Station, Karjat.
Rice Research Station, Karjat.
Agricultural College Dairy, Kirke.
Agricultural Station, Kopargaon. (Fodder and sugar cane)
Agricultural Station, Kumta. (Rice and green manure crops)
Agricultural Station, Landhi. (Field Corps, vegetables and fruits. [Substation of Willingdon Cattle Farm, Malir, Karachi]
Agricultural Experiment Station, Larkana, Sind. (Rice and other crops; soil)
Manjri Farm, Manjri. (Sugar cane)
Agricultural Station, Mirpur-Khas. (Cotton, fruit, farm implements, irrigation)
Seed Farm, Mirpur-Khas. (Cotton, wheat, fruits)
Teaching Garden, Modi Bag, Poona.
Mohol Plot, Mohol. (Multiplication of cotton seed and testing methods of dry cultivation)
Rice Station, Mugad. (Substation of Dharwar Station)
Botanic Garden of the College of Science, Poona.
Empress Botanical Gardens, Poona.
Poona Agricultural College Station, Poona.
Rice Station, Ratnagiri. (New crops and improvement of cultivation)
Agricultural Station, Sukkur.
Agricultural Station, Surat. (Cotton, soil improvement, cattle—Kankrej Breed)
Agricultural Station, Tegur. (Cattle breeding farm)
Cotton Breeding Station, Viramgam.

Burma

Agricultural Station, Akyab. (Crop improvement, cocoanuts, rice).
Agricultural Station, Allanmyo (Thayetmyo)
Agricultural Station, Hmawbi. (Field crops and rice)
Agricultural Station, Hoping, (Jute, sugar cane and other field crops)
Agricultural Experiment Station, Lashio, Northern Shan States.
Cotton Experiment Station, Mahlaing (Meiktila).
Agricultural Station, Mandalay. (Rice, irrigation, dairy cattle—Sindhi).
Burmese Agricultural College, Mandalay (Seed selection, plant pathology, sericulture).

Agricultural Station, Nagu Plats. (Cotton, sugar cane, vegetables)
Agricultural Station, Nyaunglebin (Pegu).
Agricultural Station, Padu. (Wheat, grain, cotton and peanuts)
Agricultural Station, Pakokku.
Agricultural Station, Pwinbyu (Mimbu) (Rice, non-irrigated crops, methods and implements)
Botanic Garden, Rangoon.
Agricultural Station, Tatkon. (Cotton, sugar cane)
Agricultural Station, Taungtha (Myingyan).
Agricultural Station, Thilawa (Hanthawaddy).
Agricultural Station, Yawghe. (Rice, wheat, potatoes, sugar cane, etc.)
Agricultural Station, Zigon (Tharrawaddy).

Central Provinces

Government Experimental and Cattle Breeding Farms, Adhartal (Jubbulpore). (Malvi Breed; also sugar cane, rice, wheat, indigo, etc.)
Agricultural Station, Akola. (Cotton and rotations)
Cattle Breeding Farm, Balaghat (Raigarh). (Gaolao Breed.)
Agricultural Station, Basim. (Seed and demonstration farm; cotton and wheat)
Government Seed Farm, Betul.
Agricultural Station, Bilaspur. (Seed and demonstration farm and cattle breeding station; rice, peanuts, cotton and wheat).
Seed and Demonstration Farm, Borgaon. Also cattle—Khamgaon Breed)
Experimental Farm, Chandkhhuri. (Seed and demonstration farm; also cattle—Chhattisgarhi and Malvi.)
Agricultural Station, Chhindwara. (Field crops and fruits)
Agricultural Station, Damoh. (Government seed and demonstration farm)
Agricultural Station, Drug. (Rice, sugar cane, cotton, peanuts; cattle)
Powarkhera Farm, Hoshangabad. (Cattle —Malvi Breed)
Agricultural Research Institute, Indore, Central India. (Crop improvement, cotton)
Seed and Demonstration Farm, Khandwa (Also cattle—Nimari Breed)
Horticultural Gardens, Nagpur.
Nagpur College Farm, Nagpur. (Field crops)
Government Cattle Breeding Farm, Raigarh (Gorhi).
Labhandi Farm, Raipur. (Rice and wheat)
Government Cattle Breeding Farm, Richhai (Jubbulpore), Central Provinces. (Malvi and Samival breeds)
Government Seed and Demonstration Farm, Saugor.
Government Seed Farm, Seoni.
Agricultural Station, Sindewahi. (Seed and demonstration farm; also cattle, Umarda and Gaolao Breeds)
Government Dairy Farm, Telinkheri.
Agricultural Station, Tharsa. (Sugar cane, wheat, other field crops and fruit)
Agricultural Station, Wara-Seoni. (Seed and demonstration farm)
Agricultural Station, Yeotmal. (Seed and demonstration farm.
Government Experimental Farm, Kheri (Jubbulpore), Central Provinces, India.

Madras Presidency

Agricultural Station, Anakapalle. (Rice and other field crops)
Government Sheep and Seed Farm, Bantanahal.
Government Cattle Farm, Chintaladevi.
Agricultural College, Research Institute and Experiment Station, Lawley Road P. O., Coimbatore.
Government Pomological Station, Coonoor.
Agricultural Station, Guntur. (Rice and other field crops)
Agricultural Station, Hagari. (Rice and other field crops)
Agricultural Station, Kasargod. (West Coast Coconut Station)
Agricultural Station, Koilpatti. (Rice and other field crops)
Madras Agri.-Horticultural Society, Madras.
Agricultural Station, Manganallur.
Government Rubber Station, Mooply (Cochin)
Agricultural Station, Nandyal. (Rice and other field crops)
Government Seed Potato Farm, Nanjangad, The Nilgiris.
Government Botanic Garden, Ootacamund.
Government Cinchona Plantations, Ootacamund.
Agricultural Station, Palur. (Rice and other field crops)
Government Tea Station, Peermade (Travancore).
Agricultural Station, Samalkota.
Government Coffee Station, Sidapur. (Coorg.)
Agricultural Station, Sirvel.
Agricultural Station, Taliparamba. (Rice and other field crops)
Government Rubber Station, Tenmalai (Travancore).

Native States

Baroda Botanic Garden, Baroda, Baroda Native State.
Department of Agriculture, Baroda, Baroda Native State.
Gwalior Botanic Garden, Gwalior, Gwalior Native State.
Morvi Botanic Garden, Morvi, Morvi Native State.
Botanic Gardens, Bangalore, Mysore Native State.
Mysore State Department of Agriculture, Bangalore, Mysore Native State.
Agricultural Experiment Station, Sakrand, near Nawabshah, Sind. (Field crops, cotton, soil studies, duty of water, fertilizers, etc.) [Now a part of Bombay Presidency]
Department of Agriculture and Fisheries, Trivandrum, Travancore. (Field crops and animal husbandry)
Museum and Botanic Gardens, Trivandrum, Travancore.

Udiapur Botanic Garden, Udiapur, Native States.

Northwest Frontier Provinces

Agricultural Station, Haripur. (Field crops, fruit, cattle, sheep)
Agricultural Station, Tarnab (Peshawar). (Field crops, fruit, cattle, sheep)
Agricultural Experiment Station, Peshawar. (Sheep)

Punjab

Demonstration Farm, Beas. (Seed Farm)
Government Seed Farm, Chillianwalla.
Experiment Station, Ganji Bai.
Demonstration Farm, Gujrat.
Experimental Station, Gurdaspur.
Experimental Station, Hansi. (Cotton and crop improvement)
Agricultural Station, Harappa Road. (For the reclamation of saline soils)
Government Cattle Farm, Hissar.
Demonstration Farm, Jalalabad. (Seeds for distribution; improved methods.)
Demonstration Farm, Jullundur.
Agricultural Station, Kahuta. (For reclamation of saline soils.)
Rice Farm, Kala Shah Kaku.
Lawrence Botanic Garden, Lahore.
Demonstration Farm, Ludhiana.
Agricultural Station, Lyallpur.
Demonstration Farm, Rohtak.
Government Seed Farm, Sargodha.
Demonstration Farm Sialkot.

United Provinces

Agricultural Station, Agra. (Cotton, Peanuts, Corn, etc.)
Taj Garden, Agra.
Agricultural Station, Aligarh (Western Circle). (Cotton, corn and wheat.)
Agricultural Station, Aligarh (Kalai). (Cotton, wheat, sugar cane; seed farm)
Government Gardens, Allahabad.
Agricultural Station, Atarra (Banda). (Wheat, peas, rice, cotton, corn, sugar cane.)
Agricultural Station, Bahraich. (Corn, peanuts, sugar cane, wheat.)
Demonstration Plat, Ballia. (Jopling Farm)
Demonstration Plat, Balatal, Hamirpur (Central Circle).
Benares Agricultural Station, Benares, (Eastern Circle). (Wheat, sugar cane, cotton, rice.)
Demonstration Farm, Bichpuri, Agra. (Western Circle.)
Agricultural Station, Bulandshahr (Western Circle). (Cotton, wheat, corn, sugar cane)
Botanic Farm, Cawnpore (Central Circle). (Wheat, sugar cane, cotton, corn, etc.)
Botanic Gardens, Cawnpore.
Demonstration Plat, Charbagh, Lucknow. (Eastern Circle).
Forest Research Institute, Dehra Dun.
Agricultural Station (Demonstration Farm), Etawah, (Central Circle).
Agricultural Station, Fyzabad (Eastern Circle. (Seed Farm).
Demonstration Plat, Ghazipur (Eastern Circle)
Agricultral Station, Gorakhpur (Northeastern Circle). (Wheat, sugar cane, rice, etc.)
Agricultural Station, Hardoi (Central Circle). Demonstration farm—wheat, cotton, peanuts, etc.)
Demonstration Farm, Jachonda, Muttra. (Western Circle).
Agricultural Station, Jaitpur (Hamirpur). Wheat, sugar cane, cotton, corn, etc.)
Agricultural Station, Kalianpur (Cawnpore), (Central Circle) (Demonstration Farm)
Government Gardens, Kumaun (Ranghur). (Forestry work)
Cattle Farm, Lakhimpur Kheri. (Cattle breeding—Kherigarh Breed; also Murrah buffalo)
Experimental Farm, Lucknow (Sullage Farm). (Eastern Circle)
Government Horticultural Garden, Lucknow.
Agricultural Station, Mainpuri (Central Circle) (Demonstration Farm) (Wheat, cotton, corn, rice, sugar cane, etc.)
Demonstration Farm, Marna, Fyzabad. (Eastern Circle)
Demonstration Plat, Mirzapur (Bisandarpur). (Eastern Circle)
Agricultural Station, Muttra. (Cattle Farm; Hissar, Kosi, Montgomery and English Montgomery cattle; Murrah buffalo. Cotton, wheat and sugar cane)
Agricultural Station, Muzafarnagar (Western Circle). (Demonstration Farm) (Sugar cane, cotton, peanuts, wheat, rice)
Agricultural Station, Nawabganj (Bareilly). (Western Circle) (Sugar cane, wheat, rice, etc.)
Agricultural Station, Naugawan (Sultanpur). (Eastern Circle). (Seed Farm)
Agricultural Station, Partabgarh. (Eastern Circle) (Rice, sugar cane, wheat, barley, peanuts, etc.)
Demonstration Plat, Rai Bareli. (Eastern Circle) (Turner Farm)
Research Farm, Raya (near Muttra). (Cotton)
Government Botanic Gardens, Saharanpur.
Shahjahanpur.

SEYCHELLES ISLAND

Agricultural Experimental Institutions

Botanic Garden, Seychelles Island, Indian Ocean.

MAURITIUS

Agricultural Experimental Institutions

Botanic Gardens, Curepipe.
Botanical Gardens, Pampelmousses.
Botanic Gardens, Reduit.
Director of Agriculture, Reduit.

FRENCH COLONIES IN AFRICA

Agricultural Experimental Institutions

Algeria

Ecole Menagere Agricole d'Algerie, Algiers.
Institut Agricole d'Algerie, Algiers.
Laboratoire de Chimie Agricole et Industrielle du Gouvernment General, Faculte des Sciences, Algiers.

Service Botanique d'Algerie, Algiers.
Station Agronomique, Algiers.
Station Entomologique, Algiers .
Station de Pathologie Vegetale, Algiers.
Station de Recherches Forestieres du Nord de l'Afrique, Algerie, Algiers.
Champ d'Essai des Arcades, Arcades.
Ferme-Ecole de Ben-Chicao, Ben-Chicao.
Station d'Aquiculture de Castiglione, Castiglione.
Agricultural Experiment Station, Ferme-Blanche. (Forage and field crops, etc.)
Ferme-Ecole de Guelma, Guelma.
Jardin d'Essai de Hamma, near Algiers.
Institut Agricole de Maison-Carree, Maison-Carree.
Station Botanique, Maison-Carree.
Station Ampelographique de Mondovi, Mondovi.
Station Experimentale d'Orleansville, Orleansville. (Cotton, etc.)
Station Viticole de Rouiba, Rouiba.
Station d'Elevage de Tadmit.

Dahomey

Station d'Essais de Niaouli (Cercle d'Allada). (Coffee, cocoa, maize)
Station Experimentale du Palmier a Huile, Pobe.
Jardin d'Essais de Porto Novo, Porto Novo.
Ferme Cotonniere de Savalou, Savalou.

Guinea (French)

Jardin d'Essais de Camayenne, Camayenne (a proximite de Conakry). (Coffee, cocoa, bananas, pineapples)

Haute-Volta

Ferme Cotonniere de Banakilidaga, Banakilidaga (a 18 Km de Bobi Dioulasso, sur la route de San).
Station de Banfora (Cercle de Bobi Dioulasso). (Cotton, coffee, tobacco)
Station de Saria, Saria. (Cotton, coffee, tobacco)

Ivory Coast

Station d'Essais de Bingerville, Bingerville. (Coffee, cocoa, oil palm)
Station Experimentale du Palmier a Huile de La Me, La Me (a proximite de Bingerville).

Madagascar

Station d'Ambatondrazaka, Ambatondrazaka. (Rice and peanuts)
Station d'Ambavahibe par Diego O Suarez, Ambavahibe.
Station d'Essais de Antsirabe, Antsirabe. (Potatoes and maize)
Station Agricole de l'Ivoloina, L'Ivoloina (pres de Yamayave). (Coffee, vanilla, sugar cane)
Station Agricole de Nanisana (pres de Tananarive). (Silk, fruit, rice, tobacco)
Institut de Biologie de l'Afrique Occidentale Francais, Dakar.
Direction de l'Agriculture, du Commerce et de la Colonisation, Rabat.

Senegal (French)

Station Forestiere et Maraichere de Hann, Hann.
Station Experimentale de l'Arachide de M'Bambey (Cercle de Diourbel).
Station de M'Bao, Centre Dakar et Rufisque. (Forestry)
Jardin d'Essais de Sor (Banlieue de Saint-Louis). (Pomology and truck crops)
Bergerie de Richard Toll, Tourcoing.
Bergerie de Tourcoingbam (Mission des Peres Blancs), Tourcoingbam.

Soudan (French)

Ferme de Baroueli (entre Koulikoro et Segou). (Cotton)
Station d'El Ouladji (entre Niafunke et Tombouctou). (Cotton and sheep)
Station de Koulikoro, Koulikoro. (Cotton, peanuts, rice, etc.; Pomology)
Station Cotonniere de Nienebale, Nienebale.
Laboratoire de la Service Textile, Segou, Soudan Francais (via Paris et Dakar).

Tunis

Service Botanique de la Direction Generale de l'Agriculture, Ariana, pres de Tunis, Tunis.
Direction Generale de l'Agriculture, du Commerce et de la Colonisation, Boulevard Bab-Benat, Tunis.
Station Agronomique, Tunis.
Station Cenologique, Tunis.

BRITISH COLONIES IN AFRICA

(Exclusive of Union of South Africa)

Agricultural Experimental Institutions

Gold Coast

Government Coconut Plantation, Abra, Central Province.
Government Agricultural Station, Aburi.
Botanic Garden, Aburi.
Mycological Laboratory, Aburi.
Government Sisal Plantation, Accra.
Horticultural Nursery, Accra.
Government Firewood Plantation, Achimota.
Experimental Rice Farm, Adebrem, Eastern Appolonia.
Government Cocoa Farm, Asamangkese.
Government Agricultural Station, Assuantsi, Central Province.
Communal Coconut Plantation, Atuabo, Western Province.
Communal Coconut Plantation, Cape Coast, Central Province.
Government Agricultural Station, Coomassie, Ashanti.
Agricultural Training Centre, Coomassie, Ashanti.
Agricultural Substation, Ejura, Ashanti.
Motor Cultivation Experiment Station, Ejura, Ashanti.
Agricultural Substation, Gambaga, Northern Territories.
Agricultural Substation, Hemang, Central Province.
Government Plantations, Ho, Eastern Province. (Cocoa, cola and teak)
Agricultural Substation, Juaso, Ashanti.
Government Plantation, Kete Krachi, Northern Territories.
Agricultural Substation, Kibbi.
Government Plantations, Kpandu, Eastern Province. (Cocoa, cola and teak)
Agricultural Experimental Station, Kpensu, Togoland.

Communal Coconut Plantations, Kpone-Prampram.
Agricultural Station, Kumasi.
Communal Coconut Plantations, Labadi.
Moseaso Food Farm, Moseaso, near Anyinam.
Agricultural Substation, Peki-Blengo, Eastern Province.
Provincial Nursery, Salaga, Northern Territories.
Government Agricultural Substation, Tamale, Northern Territories.
Government Agricultural Station, Tarquah, Western Province.
Communal Coconut Plantations, Temma.
Communal Coconut Plantations, Teshi.
Agricultural Substation, Wa, Northern Territories.
Agricultural Substation, Wioso, Western Province.
Provincial Nursery, Yeji, Northern Territories.
Government Plantation, Yendi, Northern Territories.

Kenya Colony

East Africa Department of Agriculture, Nairobi, Kenya Colony, East Africa.
Mycological Laboratory, Nairobi, Kenya Colony, East Africa.

Nigeria

Experimental Farm, Benin.
Research Station, Ibadan.
Experimental Farm, Ilorin.
Experimental Farm, Kano.
Agricultural Department, Lagos, South Nigeria.
Botanic Station, Lagos, South Nigeria.
Botanic Garden, Old Calabar, South Nigeria.
Experimental Farm, Umuahia.
Experimental Farm, Zaria.

Nyasaland Protectorate

Department of Agriculture, Zomba.

Rhodesia (Southern)

Bulawayo Municipal Experiment Station, Bulawayo. (Field crops)
Government Experiment Farm, Gwebi. (Crops and rotations)
Botanic Garden, Salisbury.
Department of Agriculture, Salisbury.
Experiment Station, Salisbury. (Field crops and rotations)

Sierra Leone

Commissioner of Lands and Forests, Freetown.
Botanic Station, Sierra Leone, West Africa.
Director of Agriculture, Njala, Central Province, Sierra Leone, West Africa.

Sudan

Shambat Experimental Farm, near Khartoum, Sudan, East Africa.
Wellcome Tropical Research Laboratories, Gordon Memorial College, Khartoum.
Gezira Research Farm, Wad Medani, Sudan.

Tanganyika Territory

Botanic Gardens, Dar-Es-Salaam, Tanganyika Territory, British East Africa.
Department of Agriculture, Dar-Es-Salaam, Tanganyika Territory.
Morogoro Agricultural Station, Tanganyika Territory.
Mpanganya Agricultural Station (Rufigi), Tanganyika Territory.

Uganda

Government Plantation, Bukalasa. (Cotton and other crops)
Experimental Wheat Station, Butoroga, Mubendi.
Botanic Gardens, Entebb'e.
Government Plantation, Fort Portal, Toro. (Field crops, horticulture)
Government Plantation, Kakumiro, Mubendi. (Cotton and other crops)
Government Plantation, Kampala. (Cotton and other crops)
Kumi Seed Farm, Teso District. (Sunflowers)
Cotton Seed Selection Station, Serere Farm, Teso District. (Also field crops)
Simsa Seed Farm, Teso District. (Cotton and general crops)

Zanzibar

Agricultural Department, Dunga, Zanzibar, East Africa.
Dunga Experiment Station, Dunga, Zanzibar, East Africa.
Victoria Gardens, Zanzibar, East Africa.
The M'Tao Forest Reserve, Southern Rhodesia.
Forest Nursery, Salisburk, Southern Rhodesia.
Tobacco Experiment Station, Salisbury, Southern Rhodesia.
Gwelo Municipal Experiment Station, Gwelo, Southern Rhodesia.
Municipal Experiment Station, Gatooma, Southern Rhodesia.
Biological and Agricultural Institute, Amani, Tanga, Tanganyika Territory.

Some Nematode Problems in the Pineapple Industry

HELENE TSURUYO MORITA

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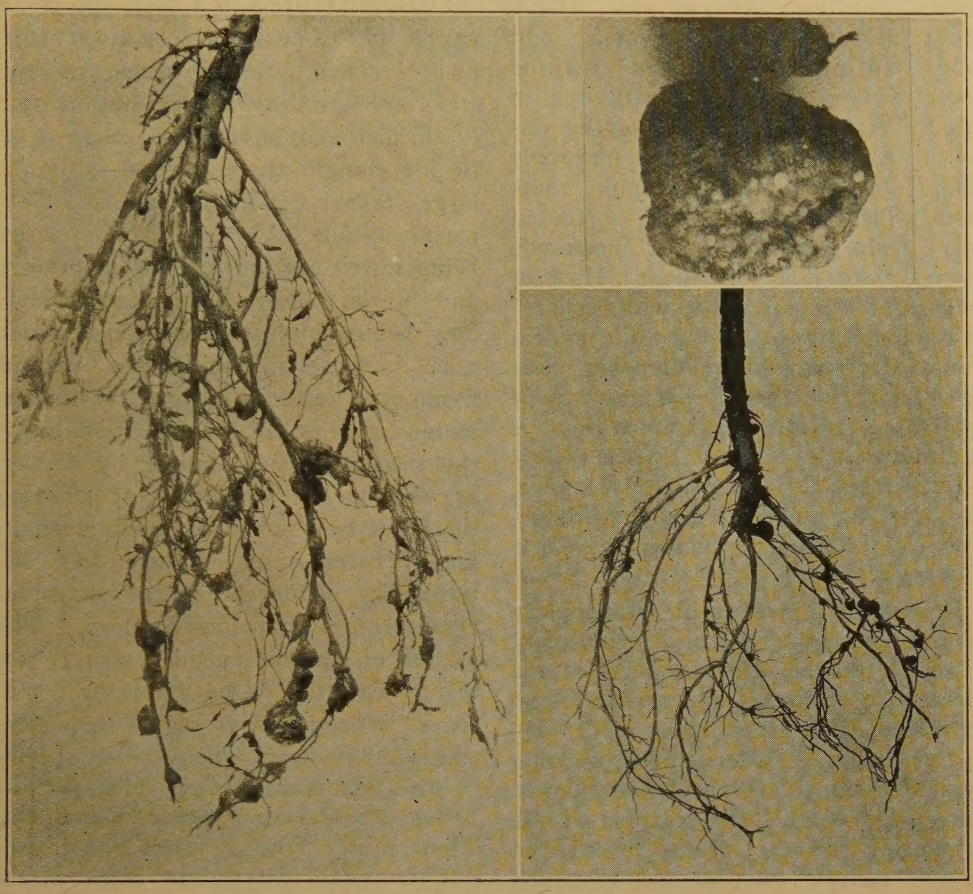
While the modern science of nematology is still in its infancy, the serious losses caused by nematodes is too well known to most men engaged in any agricultural pursuit. The field of nematology is one almost as broad as that of entomology. It deals with thousands of minute animals called nematodes. These nematodes or eel-worms, as they are popularly called, are true round-worms belonging to the Phylum Nemathelminthes, Class Nematoda, Order Nematoidea. They are more or less cylindroid, unsegmented and without locomotor appendages. The body nearly always tapers at one or both ends and nearly all the tissues are comparatively colorless and transparent, whatever decided color it possesses being usually confined to the intestinal region. Nematodes travel by means of a more or less rapid whip-like lashing of the entire body, this movement bringing about progress in water-containing debris, or in moist soil, but little or none in pure water. They vary in size from microscopic minuteness to a centimeter or more in length. Under the microscope, they show fine transverse striations, variable in numbers and fineness. These markings are used as specific, and in some cases, as generic characters.

They occur in the soil, water and sea and infest, as parasites, an immense variety of plants and animals. Nematodes from an infested ten-acre field, if arranged single file, would form a procession long enough to circle the globe. More than 80,000 different species are known to exist.

These round bodies are the females of Heterodera radicicola. Note the many eggs (500 or more) in one female.

In connection with the pineapple industry, the most destructive nematode we have to contend with is the root knot nematode, *Heterodera radicicola* Greeff. Its seriousness not only to pineapple plants, but also to a wide range of cultivated crops cannot be overemphasized. The disease is causing great alarm, especially in the warmer regions of the world because of its wide distribution. Careful estimates made on the basis of actual surveys by Dr. G. H. Godfrey of the Association of Hawaiian Pineapple Canners' Experiment Station have shown that in 1917 in Southeastern United States the loss was figured as high as 80 per cent in some cases.

The principal symptoms are malformations consisting of enlargements or "knots" in the roots of plants. These galls are usually very prominent both



Test soy bean, as trap crop, twenty-eight days from planting. Literally thousands of nematode larvae have entered the root and will die with the root if the plant is destroyed on the twenty-seventh day or earlier. First, the root of a wild bean, Phaseolus latryroides pulled from the center of a Panicum field. The heavy infection with root knots is very evident. Next a single root from the plant. Fifty or more maturing female nematodes can be seen on the exposed surface where the gall was broken open. The entire gall undoubtedly contains thousands. Another plant of wild bean, absolutely free from root knot. The swellings shown on the roots in this case are the beneficial legume nodules caused by bacteria.

in size and number but at other times are small, few and inconspicuous. Their number depends entirely upon the abundance of the nematodes. The galls vary in size from a half millimeter in diameter in mild cases to two inches in extreme infestation. One investigator reported that he had seen galls as large as a duck's egg. In pineapple roots the galls are rarely more than one half inch in diameter.

Gall formation is the result of stimulation of the root tissues by the nematode, *Heterodera radicicola*. The effect upon the function of the host is produced principally in two ways: first, by the general interruption of all the functions, and second and particularly, by the interruption of the normal flow of sap from the roots, caused by the distortion of the ducts. The nematodes also depend upon the plant juices for food. Furthermore, the diseased tissues would more easily permit the entrance of fungi or bacteria which cause decay, hence, the death of the plant may be due immediately to the nematodes themselves, or to other sources of sec-

ondary infection. In any case, plants badly infested become dwarfed and sickly and in severe cases they may be entirely killed. One can easily realize this by examining the roots of the yellowed or wilted plants in the pineapple fields. In examining pineapple roots from a badly infested field we find a very wide assortment of nematode species associated with them. Most of these nematodes are armed with "spears" in their mouth parts—a definite indication of their parasitic relationship. Nobody knows nor nobody has any way of estimating exactly how much loss is due to any one species. A great deal is surmised but little is definitely known. It is certain, however, that the productive life of an infested pineapple field is shortened.

Root knot control is not as simple a proposition as the control of many plant diseases, for the attacked parts of the plants are entirely underground and therefore difficult to reach with protective materials. Means of eradicating nematodes must also be based upon a knowledge of the life history of the organisms and the effects of environmental factors, such as soil moisture, soil temperature, soil acidity, the state of colloidal matter in the soil, the soil population in general, the amount and condition of organic matter in the soil, the concentrations of oxygen and carbon dioxide, the effects of light and of dessication. In the nematode literature little or no exact information on these points appears to be available. Hence it is the object of our investigations to determine the effect and importance of each of these environmental factors on the larvae and eggs of the nematode in relation to the pineapple roots.

Once established in a field, the eradication of the nematodes is a very difficult problem. Several means of control come into consideration but one that is efficient and at the same time practicable enough to be carried out on a large scale is yet in the process of experimentation. Various chemicals are being tested out both in the laboratory and in the fields. Other experiments now being conducted are those which take into consideration the various weaknesses in the life history of the namatode, that is, the trapping possibility, the susceptibility to killing by drying, as well as the possibility of starving them out by the use of immune plantings between crops. Then, too, the possibility of developing resistant varieties comes into consideration. The matter of natural enemies also is not being neglected. One genus of nematodes, *Mononchus,* is known to possess the cannibal habit. Fifty-seven species of this genus have been identified as being predatory on other nematodes. These savage little monsters either suck out the vitals or swallow other nematodes whole. No work has yet been carried out with these cannibals to determine the economic possibilities. Fungi and bacteria have also been found to be parasitic on nematodes. Dr. Godfrey recently discovered a fungus playing havoc on a *Heterodera.* Further work with this fungus is in the process of development to determine its economic possibilities.

We are encouraged to believe that the results obtained in our various experiments will greatly reduce the losses due to the nematodes in the pineapple fields.